
Introduction

The Electronic Switched Network (ESN) is a private communications network intended for use by large business customers with distributed operating locations.

This document introduces the reader to the concepts of the ESN with emphasis on the switching components.

References

For more information on the Electronic Switched Network or on networking features and load configuration, refer to the following Northern Telecom Publications (NTPs):

- *Electronic Switched Network signaling guidelines* (309-3001-180)
- *Electronic Switched Network transmission guidelines* (309-3001-181)
- *Features and services for Generic X11 supplementary features* (Appendix 2 to 553-2311-105) for X11 release 19 and earlier, or *X11 features and services Reference Guide* (553-3001-306) for X11 release 20 and later
- *X11 data administration input/output guide including supplementary features* (Appendix 1 to 553-2311-311)
- *International ISDN PRA Associated feature descriptions* (553-2921-100)
- *X11 features and services* (553-3001-305)
- *Basic and Network Alternate Route Selection description* (553-2751-100)
- *Coordinated Dialing Plan description* (553-2751-102)

- *ISDN Primary Rate Interface description and administration* (553-2901-100)
- *ISDN Primary Rate Interface installation* (553-2901-200)
- *ISDN Primary Rate Interface maintenance* (553-2901-500)
- *X11 input/output guide* (553-3001-400)

The prime element of an ESN is the ESN node. ESN nodes are strategically located (see [Figure 1](#)) to concentrate on-network traffic and access off-network facilities efficiently and economically. An ESN can be a single ESN node serving a few locations in a metropolitan area or multiple ESN nodes serving up to 999 locations that can be located around the world.

The ESN nodes direct calls from a switch in one geographical location to a switch in any other geographical location in a cost-efficient and easy-to-use manner by:

- eliminating long, complex dialing plans and replacing them with an abbreviated Uniform Dialing Plan (UDP) common to all switches which are part of the ESN
- providing a means of controlling the number and type of trunks that are available to each network user and of the time of day that access to a trunk (or group of trunks) is allowed
- automatically selecting the least-cost trunk route available to complete a call between switches
- providing uniform network access to stations served directly by the ESN node and stations served at other switches (ESN Mains, Conventional Mains) connected by means of tie trunks to an ESN node as shown in [Figure 1](#)
- providing the call originator with the option to either accept or refuse a call that is to be completed over an expensive trunk route if there are not any least-cost trunk routes currently available

- providing optional queuing features that allow the call originator (when all trunks are busy) to either remain off-hook until a trunk becomes idle or hang up and receive a callback from the SL-1 when a trunk becomes idle, thus eliminating repeated, time-consuming dialing attempts
- collecting and printing traffic data related to the ESN operation (thus allowing the efficiency of the network to be monitored)

To accomplish the efficient call-handling operations in an ESN, each ESN node utilizes some, or all of the following unique ESN software features listed below and described in this document:

- Transparent Data Networking (TDN, described in *Transparent Data Networking*, 553-2731-110), which provides a transparent data channel for data modules to perform end-to-end protocol exchange. With TDN, two data modules wait for a circuit path to be established before exchanging protocol parameters
- Network Class of Service (NCOS)
- Network Alternate Route Selection (NARS)
- Network Signaling (NSIG)
- Network Traffic Measurements (NTRF)
- Off-Hook Queuing (OHQ)
- Call-Back Queuing (CBQ)
- Coordinated Call-Back Queuing (CCBQ)
- Call-Back Queuing to Conventional Mains (CBQCM)
- Free Calling Area Screening (FCAS)
- Coordinated Dialing Plan (CDP)
- Flexible Numbering Plan (FNP)
- Network Authorization Codes (NAUT)

Switch definitions

In the context of this publication, the following definitions may be applied to the various switch types that are considered to be part of an ESN network. These definitions are used for convenience and do not constitute the only possible ESN configuration.

ESN node

A switch equipped with features identified in [Table 1](#) and configured within the network as shown in [Figure 1](#).

ESN main

A switch equipped with features identified in [Table 1](#) and that is connected by means of tie trunks to a single ESN node. An ESN main can also be equipped with the Basic Alternate Route Selection (BARS) feature to provide alternate route selection capabilities for calls placed to satellite switches that are located on the ESN main. See *Basic and Network Alternate Route Selection description* (553-2751-100).

Conventional main

A switch that is connected to an ESN node and equipped with none of the features listed in [Table 1](#). Included in this category are other switch types such as Step-by-Step (SXS), Electronic Tie Network (ETN), and DIMENSION.

Table 1
Feature package requirements for ESN nodes and ESN mains

Description	ESN node	ESN main
Network Alternate Route Selection	X	
Off-Hook Queuing	X	
Call-Back Queuing	X	
Coordinated Call-Back Queuing	X	X (optional)
Call-Back Queuing to Conventional Mains	X	
Network Signaling	X	X
Free Calling Area Screening	X	
Network Class of Service	X	X
Coordinated Dialing Plan	X	X (optional)
Basic Alternate Route Selection		X (optional)
Flexible Numbering Plan	X (optional)	X (optional)
Network Authorization Code	X	
Basic Authorization Code		X (optional)
Network Traffic Measurements	X	X (optional)
Note: A switch is termed a Conventional main if none of the above feature packages are equipped at the switch.		

Figure 1
Example of an Electronic Switched Network

